

ELECTRIC GRAIN ELEVATOR
(Cargill Electric Elevator)
(Eastern Grain Elevator)
40 Childs Street
Buffalo
Erie County
New York

HAER No. NY-248

HAER
NY
15-BUF
31-

WRITTEN HISTORICAL AND DESCRIPTIVE DATA
PHOTOGRAPHS

Historic American Engineering Record
National Park Service
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HISTORIC AMERICAN ENGINEERING RECORD

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Location: 40 Childs St., Buffalo, NY

Date: Mainhouse: building permit issued May, 1897
Extension: before 1913
Annex: building permit application September, 1940;
approved October 18, 1940

Designer: Mainhouse: W.E. Winn, chief engineer to the SS&ECC
Extension: unknown
Annex: H. G. Onstad

Builder: Mainhouse: Steel Storage & Elevator Construction
Co. of Cornerville, Indiana
Extension: unknown
Annex: H. G. Onstad Engineering Construction

Status: Mainhouse: demolished, mid-1980s
Extension: demolished 1984;
Annex: in limited use reprocessing grain products

Significance: The grain elevators of Buffalo comprise the most
outstanding collection of extant grain elevators
in the United States, and collectively represent
the variety of construction materials, building
forms, and technological innovations that
revolutionized the handling of grain in this
country.

Project
Information: The documentation of Buffalo's grain elevators was
prepared by the Historic American Engineering
Record (HAER), National Park Service, in 1990 and
1991. The project was co-sponsored by the
Industrial Heritage Committee, Inc., of Buffalo,
Lorraine Pierro, President, with the cooperation
of The Pillsbury Company, Mark Norton, Plant
Manager, Walter Dutka, Senior Mechanical Engineer,
and with the valuable assistance of Henry Baxter,
Henry Wollenberg, and Jerry Malloy. The HAER
documentation was prepared under the supervision
of Robert Kapsch, Chief, HABS/HAER, and Eric
DeLony, Chief and Principal Architect, HAER. The
project was managed by Robbyn Jackson, Architect,
HAER, and the team consisted of: Craig Strong,
Supervising Architect; Todd Croteau, Christopher

Payne, Patricia Reese, architects; Thomas Leary, Supervising Historian; John Healey, and Elizabeth Sholes, historians. Large-format photography was done by Jet Lowe, HAER photographer.

Historians: Thomas E. Leary, John R. Healey, Elizabeth C. Sholes, 1990-1991

This is one in a series of HAER reports for the Buffalo Grain Elevator Project. HAER No. NY-239, "Buffalo Grain Elevators," contains an overview history of the elevators. The following elevators have separate reports:

NY-240 Great Northern Elevator
NY-241 Standard Elevator
NY-242 Wollenberg Grain & Seed Elevator
NY-243 Concrete-Central Elevator
NY-244 Washburn Crosby Elevator
NY-245 Connecting Terminal Elevator
NY-246 Spencer Kellogg Elevator
NY-247 Cooperative Grange League Federation
NY-248 Electric Elevator
NY-249 American Elevator
NY-250 Perot Elevator
NY-251 Lake & Rail Elevator
NY-252 Marine "A" Elevator
NY-253 Superior Elevator
NY-254 Saskatchewan Cooperative Elevator
NY-256 Urban Elevator
NY-257 H-O Oats Elevator
NY-258 Kreiner Malting Elevator
NY-259 Meyer Malting Elevator
NY-260 Eastern States Elevator

In addition, the Appendix of HAER No. NY-239 contains brief notations on the following elevators:

Buffalo Cereal Elevator
Cloverleaf Milling Co. Elevator
Dakota Elevator
Dellwood Elevator
Great Eastern Elevator
Iron Elevator
John Kam Malting Elevator
Monarch Elevator
Pratt Foods Elevator
Ralston Purina Elevator
Riverside Malting Elevator

The original Electric Elevator built in 1897 consisted of nineteen 60' tall freestanding cylindrical steel bins rising from a concrete foundation slab that incorporated conveyor tunnels. The bins were arranged in interlocking rows and, although the original plans show two rows of five large bins, the final arrangement incorporated seven 51'-6" diameter bins and twelve 26'-4" diameter bins. The large bins were arranged in two interlocking rows, while eleven small bins in four interlocking rows were substituted for the three large bins closest to the workhouse. An additional small bin was added to the south end of the easterly row of large bins.

The total capacity of the elevator was 1 million bushels, the volumes of large and small bins being 100,000 and 25,000 bushels respectively. The bins were served from an adjoining workhouse incorporating one movable and one stationary marine tower. The workhouse and towers were of structural steel clad in corrugated iron and had pitched roofs. The bin conveying systems were housed in overhead gantries and sub-surface conveyor tunnels. The elevator was constructed by the Steel Storage and Elevator Construction Company to the design of its chief engineer, W. E. Winn, and to the patent of F. J. Weber.¹

The elevator, notable for its early use of steel as a material for bin construction and electricity as a source of power, vied with the Great Northern Elevator as the pioneer of these technologies. The Electric was built to a much earlier patent. Weber's design dates from the previous decade, suggesting that bins had been constructed to this pattern prior to 1897. This conclusion is supported by the original plans, which bear job number 137. As these were drawn up by the Steel Storage and Elevator Construction Company of Cornerville Indiana, a company specializing in construction in that material, earlier examples were probably built. The Great Northern was built to Robinson's patent of 1897, a design specifically for this elevator. The Electric obtained its building permit in March, about two months after the Great Northern, and received its first shipment in September. It is not known when the Electric was completed.

Sometime between 1900 and 1912, a single row of five freestanding cylindrical steel bins was added to the west of the existing elevator. The 60' tall bins were 66' in diameter and had hemispherical steel bottoms which rested in concrete foundation dishes. The total capacity of the extension was 750,000 bushels. The original elevator and its extension were demolished in 1984.

Little subsequent development took place at the site until Cargill Corporation bought the elevator from the Eastern Grain Corporation in June of 1938. By that date, the Cargill Corporation owned the sister Great Eastern Elevator, which had

been built by the Steel Storage and Elevator Construction Company in 1900. In 1940 Cargill closed that facility and proposed to expand the capacity of the Electric Elevator. The elevator was designed and built by H. G. Onstad Engineering and Construction of Chicago, with Arthur Skaer of Buffalo acting as supervising engineer. The Annex is 465'-4" x 217'-4", has a capacity of 6 million bushels and was built at an estimated cost of \$500,000.

Although externally it resembles a conventional cylindrical-binned elevator, the design is a radical departure from conventional storage practice; the bulk of the storage capacity was provided by six vast storage halls, within which grain was handled by power shovels (later front loaders) rather than direct spouting. The walls of the storage halls are part or whole cylinders constructed using conventional slip forming methods. A shallow pitched steel roof covers the halls and rises to a central longitudinal spine of storage bins 10' above the buttress walling. The Annex utilized the marine legs of the original elevator and only had one small elevating leg for the turning of grain. The relatively low height of the structure was dictated by the level of the overhead supply gantries of the original elevator and an unwillingness to provide for the re-elevation of grain to higher levels.

The economy of this new design provided storage at a cost of 8 cents per bushel, rather less than half the equivalent figure for a conventional elevator, and compares with the cost of 15 cents per bushel for the original facility. The work of construction proceeded apace, and is reported to "have broken all previous records." The plans were drawn in September of 1940 and the foundation works commenced by the middle of that month. The Annex was built in three stages, each involving the construction of two storage halls on either side of the central cylindrical bins. By mid-December of the same year, four storage halls with a capacity of 4 million bushels had been completed, while the remaining 2 million bushels were to be completed in January of 1941.

The logistics of this operation, the first documented case in Buffalo of the slip forming of an entire elevator during the winter months, are scantily reported. The urgency of completion is apparent, with reports that each hall of the elevator was filled to capacity immediately upon completion. Construction rates were not particularly fast, about six to ten feet per day, and were doubtless limited by the constraints of winter construction. However, these difficulties were compensated for by a design which required few foundation works, no basement works, and relatively little volume of concrete to be placed per unit of storage.

The building is a 15 x 7 block of convex-walled bin units rising directly from the foundations to a height of 80'. This buttress walling encloses six storage halls arranged in two rows of three and divided longitudinally by a central row of fifteen 90' tall whole bins. These bins are built to a tunnel design, rise directly from the foundations and discharge into a sub-basement conveyor tunnel. Transversely, the storage halls are divided by internal buttress walls to the same design as the exterior walls. The storage halls occupy areas equivalent to 5 x 3 groups of bins measuring 150' x 93'. Both whole bins and buttress walling are standard cylindrical or truncated cylindrical units 30' in inner diameter. The units are arranged in tangential contact with tangential thickening of massive proportions. The tangential thickening extends 8'-6" either side of the bin center line, and varies in thickness from 21" to 8'-6". The bin walls are 7" thick in all locations. The exterior buttress walling and the transverse internal dividing walling are two-third segments of the standard cylindrical unit linked to form continuous self-buttressing walls in which both the "bin wall and contacts are designed to act as vertical girders." Additionally, whole bins are placed at the corners of the building and at the intersection of exterior and internal subdividing walls. These bins appear to be entirely structural, apparently having no storage function.

The simple geometry of the building is modified along the north elevation to accommodate a bend in the river. The line of the river had to be maintained at this point to enable freighters to swing around the tight bend immediately downstream of the elevator. The exterior wall to either side of the dividing wall between the northwest and north central storage halls is progressively stepped inward. The instepping is accomplished by setting whole bins progressively inward by a distance equivalent to the radius of the cylinders. The bins are tiered back into the structure at a 45° angle. In order to provide adequate buttressing, the tangential thickening is maintained to its full dimension and is placed as if the bins were in longitudinal contact. However, as the bin line is now a diagonal, this arrangement exposes that part of the tangential contact which would normally form the inside of the next conventionally placed bin as concave sections of exterior walling. Like the other whole bins placed in the buttress walling, these appear to be entirely structural; there is no provision for the feed of materials from the conveyor placed in the gallery over the central storage bins.

The storage halls have varying capacities. The smallest storage volumes are provided in the northwest and north central halls, where the indentation noted above reduces storage capacity to 762,000 bushels and 777,000 bushels respectively. The largest halls are the north and southeast, both with a capacity of

930,000 bushels. Of intermediate capacity is the southwest hall, with a capacity of 840,000 bushels, and the south central hall, with a capacity of 835,000 bushels. Although the four largest storage halls occupy similar areas, the difference in storage capacity appears to reflect the placement of the internal dividing wall, determining whether it provides a convex or concave aspect to a particular hall. The capacity of the central whole bins is 50,000 bushels with the exception of three 40,000 bushel bins which are raised to provide communication between the northerly and southerly rows of storage halls.

The contract explains the design philosophy of the structure. "The outer and dividing half bins are tied across the intervening space to withstand grain pressures and the outer bin walls and contacts act as vertical girders." The lower ties are provided by a network of longitudinal and transverse concrete foundation beams, while the upper ties are of structural steel and also provide support for the roof. Despite the theory of grain pressures in deep bins ceasing to be applicable in the case of the half-bin buttress walling, the design of these walls and their tangential contacts differs little from conventional bin design. The construction of half and whole bins was effectively standardized.

Bin walls are 7" thick except at the tangential contacts. The tangential contacts are 17' across and their thickness varies from 1'-9" to 8'-6"; they are massively proportioned in comparison to conventional elevator design. The keying of the base of the contacts to the foundation beams below is unique. The keyways consist of ten transverse ridges cast into the foundation beams. The keying was completed upon commencement of bin wall slip forming, when the first lift would have formed eleven corresponding interlocking valleys in the base of the bins walls.

The verticals of both half and whole bins are 1" round jacking rods distributed in the center and at the extremities of the tangential thickening. The whole bins feature twelve jacking rods and the half bins eight. In the exterior walls, the jacking rods are supplemented by twelve 1/2" round verticals between the jacking rods on 2' centers. However, twenty-four similar verticals are placed on 2' centers about the entire circumference of the whole bins arranged within the buttress walling. In no case are 1/2" verticals placed within the tangential thickening.

The horizontal reinforcing consists of standardized round, deformed rod with a tensile strength of 21,000 psi. It is deployed in graduated sizes at varying course intervals. A constant rod size is maintained in the lower two-thirds of the bin and the coursing interval increases upward, ranging from seven courses of 3/4" rod placed on 8" centers in the first 4'-8"

of bin wall to fourteen courses on 12" centers at a height of 80'. These arrangements complete the horizontal reinforcing within the half bin walling. Within the 90' central whole storage bins, the top ten feet of bin walling is reinforced with nine courses of 1/2" rod on 12" centers. Each course consists of four overlapping rods, ranging from 3/4" rods 27'-7" in length and lapped over 3'-6" to 1/2" bars 26'-5" in length lapped over 2'-4". The horizontals are wired to the outside of the verticals. The horizontal reinforcing is completed by 1" round contact anchors placed on every course at the extremities of the tangential thickening. The contact anchors are hooked around the jacking rods of adjoining bins.

Basement works are minimal and confined to the area below the central row of whole bins. The bins are hopped at 40° angles. The hopper bottoms are reinforced concrete slabs supported by longitudinal I-beams. The hoppers rise to 8'-6" above the base of the bin, except in the three shallower bins, where the hopping is elevated within the bin to permit communication between adjacent storage halls. This arrangement, rather than the conventional mortar slab on slag infill, is necessary to provide for the discharge of grain from the storage halls to the conveyor tunnel below the center of the bin line. Such discharge is affected by the "reclaiming spouts" below the hopper slab that provide communication between the halls and tunnel. The sub-basement conveyor tunnel is 9' x 7'-6", with 12" walls and floor. The conveyor tunnel is below the general foundation level.

The foundations consist of a network of whole or part octagonal concrete foundation beams placed below the whole and half bins. The 3' x 4' foundation beams are tied longitudinally and laterally by a network of "lower ties" that forms a grid of square concrete footings below the storage hall floor slab and links buttress walls to center bins. The ties are on 31'-9" centers and their center lines are coincident with the point of tangential intersection of the bin walling. The 5' x 2' ties are reinforced by thirty-six, 1-1/4" square bars placed at three levels. The structure is built on 2,500, 8" x 8" H-section steel piles that extend 26' to solid rock. The piles are capped by a steel plate and extend into the concrete foundation works. They are designed to withstand a maximum load of forty tons. Piling is only present below the bin wall foundation beams and the conveyor tunnel walls. Double rows of piling are employed with the exception of a single row of piling on 5'-6" centers below each conveyor tunnel wall. The piles are on 2' centers below the tangential thickening, 2'-3' centers below the central bins, and 5'-6" centers below the buttress walls and corner bins.

The structure is covered by a shallow pitched structural

steel and corrugated iron roof which rises to the central row of longitudinal bins. The whole and half bins have concrete tops. A low clerestory is placed at the ridge in order to accommodate the conveyor that runs along the length of the central bins. The eastern elevation features a single steel elevating tower. The structural steel work in the roof provides a network of "upper ties," which link the concrete walling together in a similar fashion to the concrete "bottom ties." The roof is comprised of 36" I-beam rafters and 12" I-beam purlins, which provide a square grid placed on 31'-9" centers.

BUSINESS HISTORY

Shortly before Christmas in 1896, five Buffalo businessmen united to form a private joint stock corporation "to do a general elevator business for the storage of grain, and to buy, sell, and deal in grain." The company began with a paltry \$700 in capital and an authorization to raise \$350,000.² The leading member of the new corporation was Edward W. Eames. Originally from Albany, Eames was the only son of a grain trader whose own wooden elevators burned in 1852. The properties were uninsured, so the family left Albany to begin anew in Buffalo. Edward entered his father's small grain trading office on Central Wharf while still in his teens. When the elder Eames retired in 1870, Edward was twenty-eight and already an independent trader.³

Between 1879 and 1884 Eames became a leading Buffalo grain merchant. He later served as president of the Buffalo Commercial Bank, and in 1896 was quite successful. However, Buffalo grain dealers were frequently most prosperous when they both acted as merchant traders and had a captive market in their own elevators. This lesson was not lost on Eames, and, since he had both the capital and incentive, he established the new corporation with an eye to eventual elevator construction. Eames purchased property on Lot 65 in Township 10 Range 8 of the Buffalo Creek Reservation, land abutting the Buffalo River. The lot was 500' east of the Ohio Street Bridge at the intersection of Childs and Ohio streets.

The land along the river had become the site of most upgraded elevator projects of the late nineteenth century as water-borne grain traffic proved more economical than rail deliveries. Once the corporation was established in December, 1896, Eames wasted little time transferring the land to the company for the nominal sum of \$1.00. Five months later the company let the contracts for a new "absolutely fire-proof" steel-bin elevator to the engineering firm, Steel Storage & Elevator. The proposed facility, called the Eames Plant in its early days, would be a unique addition to the Buffalo waterfront. Constructed entirely of steel bins, it was to be fully electrically powered to operate the pneumatic elevating system

and the conveyors and belts in the marine leg.⁴

By mid-November the elevator was nearing completion. The construction on the steel tanks was in place, but lacking the superstructure. By November 27, 1897, SS&E announced the completion of the Electric Elevator, as it was then called, and the facility's readiness to receive its first shipments.⁵ The arrival of the Electric into the Buffalo elevator community vastly expanded the city's grain storage capacity. The Electric had a 2-million-bushel volume with the ability to load 300,000 bushels per day. The Elevator was connected by spur lines to the Buffalo Creek Railroad which in turn tied it to all other major area rail lines entering and leaving Buffalo. Perfectly situated for all forms of grain delivery and shipment, the Electric promised to be a spectacular addition to the area grain economy.⁶

By 1899 Edward Eames was no longer a director of the Electric Elevator Company. The four remaining directors were Ormsby M. Mitchell of Montclair, New Jersey, who had become president of the company, Ruleman Muller of New York City, Yale Kneeland, company secretary and also from New York, and Treasurer Henry T. Kneeland, the on-site Buffalo manager. Henry Kneeland remained in Buffalo for over fifteen years concentrating on the financial and daily operations of the Electric. Mitchell and both Kneelands remained with the company for many years. Eames returned as a director in 1900 and was on the board until his death in 1909 at age sixty-seven. All four men were owners as well as directors of the Electric Elevator Company.⁷

The early years were static for the elevator company. In 1899 the board voted to mortgage both the company's property and its franchises for \$240,000 repayable over twenty years with a fixed 5 percent interest. As was usual with stable companies whose profitability was anticipated, the bonds were to be repayable with gold coin. It is not clear, however, what the mortgage was for, except perhaps expansion of general operations, because the company did not embark on actual physical expansion until 1914. At that time it purchased approximately 2-1/3 acres between the existing elevator structure and the "Hamburg Turnpike" a block further west. The purchase price for this land was \$45,000--a very high sum for the time--and certainly reflected an optimism concerning the company's growth potential. Ironically, the Electric Elevator Company never survived to use the land itself, and substantial additions to the elevator were not made for another twenty-six years.⁸

Directors' dreams of glory notwithstanding, the Electric Grain Elevator Company continued to operate, even after Eames death, on a regular but modest basis. In 1922 it decided to

expand the amount of capital stock to \$735,000 to be issued in 7,350 shares of stock with a \$100 par value.⁹ Like the 1899 mortgage, the purpose of the capital increase is not entirely clear, but whatever the objective, it was not successful. In 1925 the Electric Grain Elevator could not survive, and in March the company was forced to sell out the elevator to a local firm, Eastern Grain Mill & Elevator, for \$550,000. A month later, the Electric Grain Elevator Company was dissolved.¹⁰

Under Eastern Grain Mill & Elevator (or Eastern Grain Elevator Corporation as it later became known), there were still no significant changes or improvements made to the Electric Elevator. EGM&E ran the elevator, apparently successfully, throughout the Depression years and likely would have continued to do so during the decades to come were it not for the untimely deaths of company owners Nisbet Grammer and John J. Rammacher in 1935 and 1938 respectively. The loss of leadership led to the break up and liquidation of Eastern Grain in 1939, shortly after Rammacher's death.¹¹

In June, 1939, the Electric passed from local ownership to become the property of one of the giant grain trading firms that dominated both the U.S. and world trade. For an undisclosed sum, Cargill, Inc. bought the entire Electric Grain Elevator property from Eastern Grain except for a small southerly roadway easement. A few weeks earlier, Cargill had arranged to purchase the nearby Superior Elevator, ushering in the giant conglomerate's interest in Buffalo with a vengeance.

Cargill, a lucrative international business, wielded the upper hand, especially over the Electric. On August 21, when the deed was drawn, it specified that payment to the Eastern Grain Elevator Corporation would be made in part as a trust fund, the monies of which were to be applied to finishing interior improvements to the elevator that had been started but not completed at least four months prior to the executing and recording of the deed. Before any money paid for the overall purchase price could be expended for any other purpose, the payments had to be applied by Eastern Grain to the cost of those renovations. Cargill's hard bargain placed an entailment on the use of the purchase-price money by heirs to the Rammacher and Grammer estates. It demonstrated Cargill's superior power relative to Eastern Grain, the strength of a national corporation over a local family business, no matter how prestigious.¹²

The Electric Elevator was essential to Cargill's Buffalo operations. Despite acquiring control over the Superior, Cargill had just lost its lease at the Canadian Pool Elevator on the lakefront and lacked sufficient capacity to further its plans to

use Buffalo as a base for east-coast export operations. The Electric, with a 1.8-million-bushel capacity, filled Cargill's needs adequately and also provided several other amenities. The Electric was served by the Pennsylvania Railroad with trackage that could simultaneously hold twenty-eight cars. The elevator's riverfront berthing space of 600' could accommodate the large lakers that brought the wheat economically from the upper Great Plains. Together with the Superior, the Electric offered enormous economic incentives to focus business on Buffalo and not divert it to Oswego, where Cargill had been using the state-owned elevator that the company could not control.¹³

Late in the summer of 1940, Cargill announced plans for a 6-million-bushel, all-concrete addition to the Electric. It was Cargill, rather than the founding company, that would take advantage of the 2-1/3-acre site bought by Electric Grain Elevator more than a quarter-century earlier. The proposed addition would have tanks 80' high. The expansion gave the Electric storage space equivalent to both of Washburn-Crosby's facilities and provided overall storage capacity of 8 million bushels--2 million in the original steel bins and 6 million in the concrete bins.

It was widely believed that Cargill's sudden push for the new addition stemmed from the emergency pressures on Canadian wheat during the early days of World War II. With Canadian ships also being called away to foreign involvement, grain supplies could not be readily shipped to Montreal. Therefore, the Electric Elevator in Buffalo could be an extremely useful siphon for both Canada and Cargill, helping to keep grain supplies moving constantly toward eastern ports for shipment to allies abroad. Expansion of the Electric would also make Buffalo one of the top three grain trading metropolitan areas in the nation, its 57-million bushel capacity behind only Kansas City and Minneapolis.¹⁴

The addition was constructed in record time. Building began in September, 1940, even before Cargill officially filed its plans and permits with the city the next month. Ostensibly, the elevator was to be completed before the end of the shipping season, in late November or early December; the pressure to finish prompted around-the-clock continuous slip form concrete pouring that allowed the wall to rise six to twelve feet per day. Theoretically each day's fresh pour should have bonded with the dried concrete of the day before, but it was a risky effort. In Duluth, Minnesota, at approximately the same time, a similar process resulted in a severely cracked and flawed structure requiring extensive repairs. The Electric Elevator did not suffer a similar fate. The walls that went up stayed up, and the

work proceeded without problems.

The elevator annex was not entirely complete by the end of the shipping season but a substantial portion was available for Cargill's winter storage. By December the Electric could hold 4 million bushels inside the new addition. The company hired ten ships to store an additional 3.5 million bushels in their holds while berthed in the city's outer harbor.¹⁵ Despite its financial and property commitment to the Electric, Cargill's interest in Buffalo was marginal. By its own admission, the company would have preferred moving grain via the St. Lawrence River to Oswego or by the Erie Canal to Albany, where the company leased the huge Port of Albany Elevator. Cargill always perceived Buffalo as a temporary storage site for the abundant yield that was overflowing the Great Plains elevators during the war years.

Other companies were more interested in the quick turn-around times in Buffalo. From unloading to New York City delivery was a thirty-hour process at most, which meant quicker return on capital. Cargill, however, with its oligopolistic hold over grain volume, was more interested in absolute cost-cutting than in rapid turn-over which it already had through steady flows of grain eastward for export.¹⁶

Despite Buffalo's peripheral role in Cargill's corporate strategy, the company continued to use the Electric Elevator for over two decades. The company made further capital improvements to the annex in both 1941 and 1942, while the demand for grain storage and transfer was so high. These renovations, however, were Cargill's last, as it made no significant expansions or refinements even during the great grain boom of the late 1940s.¹⁷

In the immediate post-war years, the demand fell sharply, and by September of 1947, Cargill closed the Electric due to a shortage of crops requiring the elevator's mammoth capacity. However, the Commodity Credit Corporation came to the rescue. CCC was a wartime rationing organization that persisted in peacetime to buy U.S. grain supplies in order to keep the prices high. Just as the Electric was closing, the CCC announced that it planned to ship 20 million bushels of grain to Buffalo just before the end of the navigation season; the grain would later be shipped by rail to New York City in preparation for European export. Thus, over a month after closing, the Electric was re-opened to handle the immense volume being consigned to Cargill from the government purchases. Once that delivery was sent eastward in May of 1948, Cargill again shut the Electric.¹⁸

For the next twenty years, the Electric's fortunes depended

entirely on Cargill's corporate whims. The company relied almost exclusively on supplies provided by the CCC and equivalent shipments from the Canadian government. In just one decade, 1958-1968 Cargill earned \$76 million in storage fees from the U.S. government for handling surplus grain. The company generated enormous sums from the sale of that grain, which was its to dispose of at any price. This arrangement required Buffalo as a linchpin in the transfer system so that Cargill's Buffalo grain elevator operations, especially the Electric, received a hefty percentage of that storage trade.¹⁹

In May, 1967, the Electric was closed once again due to vagaries in shipping and supplies available for storage. In August of 1968, Cargill announced that the Electric would reopen to receive shipments due from the Great Plains. The revival did not last. The single incentive that kept the Electric vital to Cargill's operations was the preferential railroad rates between Buffalo and eastern port cities. Low rail costs, coupled with fast turn-around times to eastern ports, offset the slower but cheaper rates of the St. Lawrence Seaway. Furthermore, cheap rail rates made Buffalo an ideal winter storage site for eastward shipping when the seaway was closed.

However, beginning in 1964, Buffalo gradually lost its preferential grain shipping rates to Pittsburgh, (which had no grain elevators) when the Interstate Commerce Commission succumbed to Pennsylvania's pressure to change the rate structures in its favor. Cargill persisted in Buffalo until the rates were decisively changed to Buffalo's disadvantage, and the company embarked on a transport system that undercut all other costs. It adopted a plan called "Rent-a-Train" (RAT) in which Cargill leased an entire train and rights-of-way at rates below regular commercial costs. Using the "RAT", Cargill could simply by-pass Buffalo outright, making all of Cargill's transfer elevators obsolete overnight. There was no longer any incentive to store grain in Buffalo, so when Cargill closed them for good, the Electric joined the Superior and other elevators as moribund facilities.²⁰

Cargill did not relinquish control over the Electric Elevator immediately because no buyers could be found. The company constructively abandoned the property and ceased paying taxes, as it did on the Superior Elevator. After more than a decade of negligence, the Electric was brought to court for non-payment of taxes, and the property was put up for auction June 30, 1982. Cargill was the winning bidder, repurchasing the Electric for \$40,000, much less than the company owed on the delinquent tax bill.²¹

On December 19, 1983, Cargill finally sold the Electric Elevator to International Products Group of Niagara Falls, New York. IPG bought all of the property except for one easement reserved to the City of Buffalo and another for the adjoining elevator then owned by Peavey Company. Three months later in March of 1984, IPG applied for a permit to demolish to grade the steel tanks of the original Electric Elevator. The demolition was accomplished later that same year, leaving only the massive 6-million-bushel concrete section intact.²²

Four years after assuming ownership, IPG sold the property to Gerald J. D'Ambrosio and Marylou Giannini, also of Niagara Falls, who immediately sold the elevator to Philip Gellman, another Niagara Falls resident. Gellman in turn sold the property to his company, Gelinmac Storage Corporation, a "grain dealer" located at Gellman's own address. Gelinmac has refurbished the concrete section of the Electric and continues to operate the facility, but, with no marine leg, the elevator is a gigantic warehouse for bulk storage rather than a transfer facility. Nevertheless, it remains a viable part of Buffalo's grain industry and an active part of riverfront commerce.²³

MATERIALS HANDLING: HISTORY AND DESCRIPTION

Despite the mammoth size of its bins, the grain handling machinery in the Electric Elevator's concrete annex was disproportionately spartan. The non-proliferation of elevating, conveying, weighing and conditioning facilities was attributable to the particular role of the new structure in the overall grain trade--long-term storage in enormous quantities. Constructed during a grain glut at the outset of World War II, this second phase of the Electric had little need for the array of vertical and horizontal handling equipment that a rapid transfer house of equivalent capacity would have required.²⁴

As in the case of the 13,000,000-bushel Port of Albany Elevator which shared certain features with the Electric Annex, Cargill may also have envisioned using the large open bins for storage of merchandise or commodities other than grain and therefore opted to install minimal handling equipment. H.G. Onstad, who had been in charge of the Albany project when he was with the James Stewart Corp., did employ slackline buckets for handling grain there; however, he did not repeat that use of interior cableways in the later Buffalo elevator.²⁵

The processes of unloading from vessels and cars, instore and outstore weighing, grain conditioning, and loading out by water or rail all transpired through the workhouse of the 1897 Electric Elevator, now demolished. A 42" belt housed in a 200' inclined conveyor bridge--also no longer extant--carried grain

from the original headhouse to the cupola of the new annex. Situated above the central row of circular bins, the cupola was a steel structure covered with corrugated metal and designed to house a longitudinal distributing belt with tripper, shipping leg head pulley and related apparatus. The conveyor consisted of a four-ply, twenty-eight oz. rubber-covered cotton duck belt, 30" wide, extending between a 24"-diameter, rubber-covered head pulley and an 18" tail pulley with protected screw take-ups. The cupola belt was reversible. A self-propelled two-pulley tripper spouted grain from the horizontal conveyor down to the central circular tanks and large rectangular storage bins. The tripper spouting consisted of fourteen-gauge steel with rack-and-pinion slides and chain-sprocket connections to insure that one slide would close when another opened.

In order to turn grain over from bin to bin or transfer out of storage back to the Electric mainhouse, the annex was equipped with a conveyor housed in a reinforced concrete tunnel under the center row of circular tanks. The central bins were hoppers for gravity discharge to the conveyor. However, the clear-span storage halls required shoveling to move grain along their flat bottoms to the reclaiming spouts. Originally, sets of man-guided power shovels served each of the large rectangular bins; an 8' x 9' platform was located below the rooftop monitor in each bin.

The specifications of the lower conveyor were identical to its counterpart up in the cupola, including anti-friction self-aligning bearings. The tunnel belt delivered grain drawn from storage either to the conveyors under the steel tanks of the original Electric for loading out through the workhouse or to the annex lofter for reelevation as part of the routine for aerating the contents of the bins to prevent spoilage. The lofter leg at the east end of the annex provided a means of raising grain to the cupola conveyor independently of the main workhouse. The rubber-covered head pulley measured 72" in diameter and 40" across its face; the diameter of the boot pulley was 24". The lofter boot was furnished with an Edmonds automatic take-up. The 12" belt carried around the head and boot pulleys was composed of six-ply, thirty-two oz. cotton duck covered with rubber. The leg, rated at 25,000 bu./hr., discharged to the cupola conveyor for the return trip to storage. The specifications of the motors powering the lofter, conveyors and shovels and the rated hourly capacity of the belts remain undetermined.

After lying idle for a number of years, the Electric annex was reactivated and modified in 1987.²⁶

ENDNOTES

1. The following paragraphs are based on information from several sources including city building permits and plans housed in Buffalo City Hall and Sanborn Fire Insurance maps. Contemporary articles relating to the mainhouse occur in The Engineering News 39, 171, and The American Elevator and Grain Trade, 36 (17 September 1898): 147. Information on the annex can be found in the Grain Dealers Journal, Special Plans Book, 3, 1913. The Cargill Annex is described in Grain Dealers Journal, Special Plans Book, 5, (1942): 13.
2. Erie County Clerk (ECC), Corporations, Electric Grain Elevator Company, Box 5575, Certificate of Incorporation, December 22, 1896. All Erie County Clerk documents are listed by date of document origin, not by date of filing, unless otherwise stated.
3. Buffalo Express, 26 September 1909.
4. ECC, Deeds, Liber 778, January 12, 1897, 408; Buffalo Express, 9 March 1897, p. 14.
5. Buffalo Express, 18 November 1897, p. 9; 27 November 1897, p. 7.
6. Beeson's Marine Directory (Chicago: Harvey C. Beeson, 1915), 218.
7. ECC, Corporations, Electric Grain Elevator Company, Box 5575, Annual Report, January, 1899-January, 1909; Buffalo City Directory, 1922; Beeson's, 218.
8. ECC, Corporations, Electric Grain Elevator Company, Box 5575, Consent to Mortgage, April 28, 1899; Deeds, Liber 1294, June 4, 1914, 94-6.
9. ECC, Corporations, Electric Grain Elevator Company, Box 5575, Consent to Increase Stock, December 11, 1922.
10. Buffalo Courier, 19 April 1925, p. 79; ECC, Deeds, Liber 1784, March 13, 1925, 572-73; Corporations, Electric Grain Elevator Company, Box 5575, Certificate of Dissolution, April 18, 1925.
11. For more details concerning Eastern Grain Mill & Elevator, see "Concrete-Central."
12. ECC, Deeds, Liber 3038, August 21, 1939, 47-9.
13. BECPL, Scrapbook, "Harbor," vol. 3, 30-31. See the Superior Grain Elevator for greater detail on Cargill's history in Buffalo.

14. Buffalo Courier-Express, 30 August 1940, p. 28; BECPL, Scrapbook, "Industry," Vol. 5, 120.
15. BECPL, Scrapbook, "Industry," vol. 5, 84, 94, 120, 127; Buffalo City Hall, Permits and Plans, Permit #32686, Ohio Street; Grain Elevators of North America, 5th ed. Report of historian at Maritime Museum, Duluth, Minnesota.
16. BECPL, Scrapbook, "Industry," Vol. 5, 94; Robert W. Elmes, "Portal to the West, Gateway to the East," Buffalo Journal of Commerce, 34 (January, 1924).
17. Buffalo City Hall, Permits and Plans, Permit #33591, August 6, 1941; #33624, August 14, 1941, #38113, October 3, 1942.
18. Buffalo Evening News, 18 October 1947, 13; 5 May 1948, 8.
19. Roger Burbach and Patricia Flynn, Agribusiness in the Americas (New York: Monthly Review Press, 1980), 237.
20. Buffalo Evening News, 4 March 1964, 41; 26 August 1968, p. 21; Burbach and Flynn, Agribusiness in the Americas, 238-39.
21. ECC, In Rem Action 8, Index Number E-9042; Deeds, Liber 9137, June 30, 1982, 275-76 and recorded Liber 9665, December 31, 1985, 28.
22. ECC, Deeds, Liber 9301, December 19, 1983, 333; Buffalo City Hall, Permits and Plans, Permit # B40332, March 27, 1984.
23. ECC, Deeds, Liber 9761, September 4, 1987, 443, 445, 447; Liber 9820, January 27, 502, 504; Liber 9301, December 22, 1983, 333-36; Buffalo City Hall, Permits and Plans, Permit #E 5331, June 25, 1987.
24. Buffalo Courier-Express, 30 August 1940, p. 28; Buffalo & Erie County Public Library, Local History Scrapbooks, "Industry," Vol. 94 (Buffalo News, 1 October 1940); 120 (Buffalo News, 29 November 1940); 129 (Buffalo Courier-Express, 16 December 1940, Buffalo News, 16 December 1940).
25. "Catenary Steel-Plate Roof for Grain Elevator," Engineering News-Record, 111 (3 August 1933): 137-40.
26. Building Permits #192281 (5 June 1987) and #E5331 (25 June 1987).

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Unless otherwise indicated, information about machinery and process flows has been derived from the following sources.

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Buffalo City Directory, 1922.

Buffalo Courier, 19 April 1925, p. 79.

Buffalo Courier-Express, 30 August 1940, p. 28; 16 December 1940.

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Buffalo Evening News, 29 November 1940; 16 December 1940; 18 October 1947, 13; 5 May 1948, 8; 4 March 1964, 41; 26 August 1968, p. 21.

Buffalo Express, 9 March 1897, p. 14; 18 November 1897, pp. 7-9; 26 September 1909.

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#32686 (18 October 1940)

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#33624 (14 August 1941)

#RO37243 (22 April 1942)

#RO38113 (3 October 1942)

Burbach, Roger and Patricia Flynn, Agribusiness in the Americas. New York: Monthly Review Press, 1980.

"Cargill's 6,000,000 Bushel Fireproof Annex at Buffalo," [Grain Dealers Journal], Grain Elevators of North America, 5th ed. (Chicago: Grain and Feed Journals Consolidated, 1942), 13.

"Catenary Steel-Plate Roof for Grain Elevator," Engineering News-Record, 111 (3 August 1933): 137-40.

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Erie County Clerk, Records, Erie County, NY.

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Grain Elevators of North America, 5th ed. Report of historian at Maritime Museum, Duluth, Minnesota.

Sanborn Fire Insurance maps.

APPENDIX

Mainhouse

Cost: \$150,000 (City Record), \$200,000 (Engineering News)

Foundation: Concrete plinth with sub-surface anchor blocks through which pass 1" tie bars holding the bins within the receiving dishing of the concrete plinth; bed rock at 7'

Basement: Conveyor tunnels below plinth; two extend full length of building; two shorter tunnels receive from the intermediate rows of small bins close to the workhouse

Bins: Steel, freestanding cylinders with integral hemispherical hopper bottoms
7 Large bins, 51'-6" in diameter, 60' high, 100,000 bushel capacity
12 small bins, 26'-4" in diameter, 60' high, 25,000 bushel capacity
Original plans show 10 large bins in 2 interlocking rows of 5; before construction commenced plans altered; 11 small bins in 4 interlocking rows substituted for 3 large bins closest to workhouse (one from the west row and two from the east row); an additional small bin added to the south end of the eastern row of large bins; 4 small bins divided internally into 4 compartments of 6,000 bu. capacity; a single overhead gantry served all bins

Gallery/
Workhouse: Structural steel workhouse at north end of structure; marine towers incorporating one fixed marine leg and served by a further movable leg; structural steel, clad in corrugated iron; double pitched roof

REFERENCES: The City Plans Book for 1897 provides the estimated costs of construction and city building permits the dates. Contemporary articles occur in Engineering News, 39, p. 171; American Elevator & Grain Trade, 36 (17 September 1898): 147. The original plans are housed in Buffalo City Hall. The plans give the location of the SS&ECC as Indiana, although all later articles suggest it was based in Buffalo by early 1898.

Extension

Foundation: to rock at 7'

Basement: Tunnel-type, with bins located on dished concrete foundation plinths

Bins: Capacity 760,000 bushels
Main bins, free-standing single row of 5 bins to west of and parallel with the original structure
Hemispherical steel bin bottoms rested within the foundation plinth; bins approx. 66' in diameter and 60' tall

Gallery: Gantry-type gallery from workhouse similar to those serving original bins

REFERENCES: No definite date of construction has been traced. An advertisement in Grain Dealers Journal, Special Plans Book 3, 1913, shows the complex complete with the five additional tanks. The dimensions have been taken from Buffalo City Hall plans for the 1941 Concrete Electric Annex. The capacity of the new tanks is unclear; an advertisement in the Grain Dealers Journal, 36 (15 September 1917): 147, gives a total capacity of 2 million bushels, implying 1,000,000 bushels of storage in the new tanks. The Sanborn Fire Insurance maps give the capacity as 765,000 bushels.

Annex

Cost: \$500,000

Foundation: H-section steel piles capped by octagonal footings beneath whole bins and buttress wall 2/3 bins; rectangular grid of 2' x 5' "base ties" reinforced with 36, 1-1/4 square bars in three layers; they tie buttress walls to center bins and form foundation for storage hall floor slab; piling absent below ties

Basement: Central conveyor tunnel below row of whole bins

Capacity: 6,000,000 bushels

Bins: Main bins 15 x 1 in center of building; 1 at each corner of structure, 6 in various configurations at the four intersections of exterior and interior buttress walls; all bins cylindrical, 30' in diameter
Storage halls: 6 large halls sharing the central row of whole bins as a rear wall; all other walls are buttress walls formed by a connecting series of 2/3 sections 30' in diameter; cylindrical bins; elevator appears to have 7 rows of 15 bins; central bins 90' tall; buttress walling 80' high Tangential intersections to all whole bins and 2/3 bins except where configuration is altered to accommodate bend in river; here bins become interlocking and are joined by short link walls; tangential links 17' wide
Vertical reinforcing 1" round rods; whole bins composed of 12 jacking rods supplemented by ordinary verticals to provide 1' spacing where there is no tangential thickening of wall Buttress walling has 8 jacking rods supplemented by 12 verticals on 1' centers where there is no tangential thickening of the wall
Horizontal reinforcing, round, deformed rod, graduated in size; conventional arrangement also in buttress walling; horizontals wired to outside of verticals; contact anchors 1" in diameter hooked around jacking rods

Gallery: Structural steel clad in corrugated iron Whole and 2/3 bins have concrete tops; storage hall is roofed with low pitched roof of structural steel clad in corrugated iron; 36" I-beam rafters and 12" I-beam purlins provide "upper ties," that in combination with the "lower ties," tie the buttress walling to the central bins

REFERENCE: Army Engineers microfiche of the original drawings and contract are housed in Buffalo City Hall. City building permits provide dates and City Plans Book for 1936 costs. The Grain Dealers Journal, Special Plans Book, 5 (1942), 13 describes the structure.